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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,591	FUKUHARA, KAZUYA	
	Examiner	Art Unit	
	Mia M. Thomas	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is made responsive to applicant's remarks received on 29 October 2007. In the outstanding Office Action, the Examiner objected to claim 12; rejected claims 15-20 under 6, 172, 365 (Hiroi et al.); rejected claims 8-14 under 6,222,195 (Yamada et al.); and rejected claims 1-7 under 2001/0019407 (Sato et al.) in combination with Hiroi et al. By this amendment, applicant has amended claims 1, 2, 9, 12, and 16. Claims 1-20 remain pending in this application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. The claims are generally narrative and indefinite, failing to conform to current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

4. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regards to Claim 1, line 15 of the claim presents the limitation of "comparing". It is unclear to the Examiner as to what is being compared. Is the comparison between the "inspection image patterns" and the "reference image data"? Appropriate clarification is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (US 6,222,195 B1) in combination with Noguchi et al. (US 6,016,187).

Regarding Claim 8: Yamada discloses a processor for inspecting an illumination optical system of an exposure tool (Refer to Figure 1; "A method of detecting deficiency of an aperture used in a charged-particle-beam exposure process employing at least two exposure columns is disclosed..." at abstract), comprising:

a data input module (Refer to Figure 1, numeral 152 via numeral 160), configured to acquire a reference image and inspection images of a plurality of inspection patterns of a resist film having a plurality of openings (Refer to Figures 2a and 2b, Figure 2a resembling the acquisition of the image and Figure 2b, resembling the reference image and inspection image with a plurality of inspection patterns),

the imaging components placed so as to deviate from an optical conjugate plane of the surface of the resist film (Refer to Figure 7, specifically, numeral 26 and Figures 3a and 3b) an image processing module configured to calculate reference image data and inspection image data from the reference image and the inspection images, respectively (Refer to Figure 4);

and a determination module configured to compare the inspection image data with the reference image data, so as to determine whether the inspection image data is abnormal (Refer to Figure 4, numeral S4-S7).

Noguchi et al. teaches the inspection patterns (By way of example, refer to Figures 15a, and 15b, further at column 10, lines 53-60) obtained by projecting exposure beams output from a plurality of effective light sources (Refer to Figure 4 and Figure 5) onto the resist film coated on a surface of an exposure target substrate (Refer to Figure 4, numeral 200) by a plurality of imaging components (Refer to Figure 4, numeral 3000).

Yamada does not specifically disclose inspection patterns obtained by projecting exposure beams output from a plurality of effective light sources onto the resist film coated on a surface of an exposure target substrate by a plurality of imaging components.

Yamada and Noguchi are combinable because they are in the same field of exposure apparatus' and methods. (See the title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to use an inspection patterns obtained by projecting exposure beams output from a plurality of effective light sources onto the resist film coated on a surface of an exposure target substrate by a plurality of imaging components.

The suggestion/motivation for utilizing the teaching of Noguchi with the disclosure of Yamada would have been to create pinholes for the imaging components to sketch onto the resist film or

more particularly for the resist film to have the best possible inspection pattern and/or inspection pattern references to alleviate potential artifacts and to decrease production flaws and imaging transmission problems, thus making the processor for the illumination and optical inspection more efficient. Further, an electron beam can be made of multiple LED's thus a plurality of effective light sources. An electron beam is also defined by many of ordinary skill in the art as a "group of parallel lines or sources of electromagnetic radiation."

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Noguchi with the disclosure of Yamada to produce the specified claimed elements of Claim 8.

Regarding Claim 9: Yamada discloses wherein the reference image data and the inspection image data [[are]] include at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern ("The exposure-column unit 110 further includes a first slit 115 shaping the electron beam rectangular, a first lens 116 converging the shaped beam, and a slit deflector 117 deflecting a position of the shaped beam on a block mask 120 based on a deflection signal S1." at column 1, line 45).

Regarding Claim 10: Yamada discloses wherein the abnormal inspection image being due to a defect including at least one of dust, a scratch in an illumination optical system ("A difference between the two waveforms indicates that either one of the mask patterns 13A or 13B has a defect. In this case, it is possible to rely on a visual inspection to determine which one of the mask patterns 13A and 13B has the defect." at column 12, line 23) which forms the effective light source, and an aberration of the illumination optical system ("A subsequent inspection after

the replacement of one of the masks will be repeated until no difference is detected between the two signal waveforms." at column 12, line 30).

Regarding Claim 11: Yamada discloses wherein the imaging components are a plurality of pinholes provided in an opaque film (Refer to Figures 10a and 10b; "For the pattern inspection of this embodiment, a glass board coated with a thin metal layer (e.g., Cr wafer) is preferably used, and a pattern is transferred onto the metal layer by etching. This is because a sharper pattern than a resist pattern can be formed on the metal layer on the glass board to achieve more reliable inspection by using the comparison-inspection device." at column 16, line 59).

Regarding Claim 12: Yamada discloses the processor of claim 8, wherein the imaging components are a plurality of lenses in a lens array ("...a first lens 116, The exposure-column unit 110 further includes second and third lenses 118 and 119 opposing each other..." at column 1, line 52).

Regarding Claim 13: Yamada discloses [wherein] the pinholes configure a diffraction grating having a translucent film and a transparent portion arranged in a grid pattern (Refer to Figure 6, S11-S19, specifically, numeral S13).

Regarding Claim 14: Yamada discloses [wherein] the reference image data and the inspection image data further include a variation of a center position between at least one of the inspection patterns formed by a zeroth-order diffraction beam of the diffraction grating and an outer edge formed by a plurality of first-order diffraction beams, and a size of the outer edge (Refer to Figure 6, numeral S16).

7. Claims 15-18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroi (6,172,365 B1) in combination with Sato et al. (US 6,317,198 B1).

Regarding Claim 15:

Hiroi discloses a method for manufacturing a semiconductor device ("The present invention relates to a method ... for obtaining an image or a waveform representing a physical property of an object such as a semiconductor wafer with an electron beam..." at column 1, line 15) comprising:

executing an inspection processing of an exposure tool ("...an object of the present invention is to provide an electron beam inspection method, and apparatus..." at column 1, line 52) including:

coating a surface of an inspection target substrate with an inspection resist film ("A semiconductor is fabricated on a semiconductor substrate (wafer) via a film..." at column 33, line 29);

generating a plurality of inspection patterns of the inspection resist film having a plurality of openings (Refer to Figures 4a-4c), by projecting exposure beams output from a plurality of effective light sources onto the inspection resist film via the imaging components ("By using an electron beam according to the present invention, a pattern on an object such as a semiconductor wafer is detected." at column 11, line 40);

measuring one of the inspection patterns as a reference image (Refer to Figure 4a), and processing the reference image so as to provide reference image data (Refer to Figure 13, numeral 25); and determining an abnormal inspection image by measuring inspection images of the inspection patterns (Refer to Figure 4b) and comparing a plurality of inspection image

data provided by processing the inspection images with the reference image data (Refer to Figures 4b and 4c, also Figure 23, numeral 53);

correcting the exposure tool by acquiring a type of defect from the abnormal inspection image when the abnormal inspection image is determined to occur (Refer Figure 13, numeral 27);

coating a semiconductor substrate with a manufacturing resist film (Refer to Figure 14a-14c; "A semiconductor is fabricated on a semiconductor substrate (wafer) via a film..." at column 33, line 29);

loading a manufacturing photo mask and the semiconductor substrate to the exposure tool (Refer to Figure 14a, numeral 31a; Figure 14b, numeral 31b, by way of example), and subjecting the semiconductor substrate to a manufacturing process of a semiconductor device by delineating the manufacturing resist film using the manufacturing photo mask (Refer to Figure 18).

Hiroi does not specifically disclose placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film.

Sato teaches placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film (Refer to Figure 4; "The pattern in the reticle 2 is put in the position 5 cm closer to the light source than the position of the normal reticle 2 surface conjugate with the wafer 5 in the projection optical system 3. With the pattern in the position, exposure is made in the defocused state. The dosage of exposure is set at 20 times that in normal exposure. A positive photo-resist is used as photosensitive material. The wafer 5 coated with photo-resist is placed in the position where normal pattern exposure is to be made. After exposure, development is made to produce a resist pattern." at column 6, line 17).

Hiroi and Sato are combinable because they are in the same field of semiconductor manufacturing inspection and exposure tools inspection. (See title and abstract of both inventions).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to place a plurality of imaging components deviating from an optical conjugate plane on a surface of the inspection resist film.

The suggestion/motivation for doing so would have been to provide a function for the imaging component for the resist film. The imaging components which deviate from an optical conjugate plane controls the exposure on the substrate (resist film).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film as taught by Sato with the method for manufacturing a semiconductor device as disclosed by Hiroi to obtain the claimed invention as specified in claim 15.

Regarding Claim 16: Hiroi discloses wherein the reference image data and the inspection image data [[are]] include at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern ("From the strength (brightness) of a digital image signal correlative to the yielded secondary electrons detected by the sensor 11 in a place coinciding with the outside shape of a pattern (material A or B)..." at column 21, line 52).

Regarding Claim 17: Hiroi discloses wherein the abnormal inspection image being due to a defect including at least one of dust, a scratch in an illumination optical system which forms the effective light source, and an aberration of the illumination optical system (Refer to Figure 4b, "Image With Defect Appearing Small").

Regarding Claim 18: Hiroi discloses wherein the imaging components are a plurality of pinholes provided in an opaque film ("A semiconductor is fabricated on a semiconductor substrate (wafer) via a film forming dry process for forming an insulator film such as an interlayer insulator film or a guard film and a wiring metal film, an etching dry process for forming an insulator film pattern having a circuit pattern and through-holes..." at column 33, line 29).

Regarding Claim 20: Hiroi discloses wherein the pinholes implement diffraction grating having a translucent film and a transparent portion arranged in a grid pattern (Refer to Figure 16, numeral 48 and 49; "...a potential providing device 19 such as a grid disposed between the objective lens 18 and the wafer (object) 20, a wafer holder 21 for holding the wafer 20 mounted thereon..." at column 24, line 67).

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroi (6,172,365 B1) in combination with Sato et al. (US 6,317,198 B1) as applied above, and further in view of Schulze et al. (US 7,221,788 B2).

Regarding Claim 19:

The combination of Hiroi and Sato discloses all the claimed elements as listed above. However, the combination of Hiroi and Sato does not specifically disclose imaging components are a plurality of lenses in a lens.

Schulze teaches wherein the imaging components are a plurality of lenses in a lens array ("To record an image of the pattern formed on the mask, the mask is irradiated with light from one side and an image of the light transmitted through the mask is recorded using a sensor mounted on the other side. A lens projection system is used to yield a sharp image." at column 9, line 57).

Hiroi, Sato and Schulze are combinable because they are in the same field of semiconductor defect detection.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to provide a plurality of lenses in a lens array as the imaging components for this invention.

The suggestion/motivation for doing so would have been to create a more efficient defect inspection tool. Utilizing a plurality of imaging components would create multiple positions to calculate and determine artifact and defects in an inspection method/technique.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the lens array as taught by Schulze with the method of manufacturing a semiconductor as disclosed by the combination of Hiroi and Sato to obtain the invention as specified at Claim 19.

10. Claims 1 are rejected under 35 U.S.C. 103(a) as being obvious over Sato et al. (2001/0019407 A1), hereinafter referred to as Sato '407 in combination with Sato et al. (US 6,317,198 B1), hereinafter referred to as Sato '198.

Regarding Claim 1: Sato '407 discloses an inspection method for an illumination optical system (Refer to Figure 2) of an exposure tool comprising:

coating a surface of an exposure target substrate with a resist film ("...a plurality of resist patterns are transferred onto the wafer." at [0026]; "Further, in general cases, the circuit pattern of the photo-mask is focused and projected on a substrate applied with a photosensitive material, e.g., a silicon wafer applied with photo-resist." at [0005]);

generating a plurality of inspection patterns of the resist film having a plurality of openings ("FIGS. 15A and 15B are views showing shapes of photo-resist patterns formed by an inspection method according to the embodiment, compared with another embodiment..." at [0046]), by projecting exposure beams output from a plurality of effective light sources onto the resist film via the imaging components ("An illumination optical system can be constructed by an aggregation of a plurality of point light sources, as specifically shown in FIGS. 6E to 6H." at [0075]);

measuring one of the inspection patterns as a reference image, and processing the reference image so as to provide reference image data ("Of course, at least one of the photo-mask and the wafer may be shifted from a conjugate position in the light axis direction." at [0028]; "FIG. 4 is a plan view showing photo-resist patterns obtained by pattern exposure according to the embodiment", where numeral 32 serves at the reference image." at [0035]);

measuring inspection images of the inspection patterns ("...a step of guiding light emitted from an illumination optical system to a photo-mask where a pattern is formed of an optical member including a light transmission pattern as a diffraction grating pattern, in which a light transmission part and a opaque part are repeated in a predetermined direction..." at paragraph [0019]), and processing the inspection images with the reference image data so as to provide a plurality of inspection image data (Refer to Figures 6a-7h); and determining an abnormal inspection image by measuring inspection images of the inspection patterns and comparing a plurality of inspection image data provided by processing the inspection images with the reference image data (Refer to Figures 15a-15b; "For comparison, FIG. 15B schematically shows photo-resist patterns in case of using a normal mask not formed of a attenuated phase shift mask but formed of only a light transmission part and opaque parts. As shown in FIG. 15B, areas where the first-order diffraction light patterns 142 to 145 are formed overlap an area where the zeroth-order diffraction pattern 146 is formed on the wafer 5.." at [0124]).

Sato '407 does not specifically disclose placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film. However, Sato '198 teaches placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film (Refer to Figure 4; "The pattern in the reticle 2 is put in the position 5 cm closer to the light source than the position of the normal reticle 2 surface conjugate with the wafer 5 in the projection optical system 3. With the pattern in the position, exposure is made in the defocused state. The dosage of exposure is set at 20 times that in normal exposure. A positive photo-resist is used as photosensitive material. The wafer 5 coated with photo-resist is placed in the position where normal pattern exposure is to be made. After exposure, development is made to produce a resist pattern." at column 6, line 17).

Sato '407 and Sato '198 are combinable because they are in the same field of semiconductor manufacturing inspection and exposure tools inspection. (See inventor, title and abstract of both inventions).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to place a plurality of imaging components deviating from an optical conjugate plane on a surface of the inspection resist film.

The suggestion/motivation for doing so would have been to provide a function for the imaging component for the resist film. The imaging components which deviate from an optical conjugate plane controls the exposure on the substrate (resist film).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film as taught by Sato'198 with the method for inspection a semiconductor (exposure tool) device as disclosed by Sato '407 to obtain the claimed invention as specified in claim 1.

11. Claims 2-4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (2001/0019407 A1), in combination with Sato et al. (US 6,317,198 B1), and further in view of Hiroi (6,172,365 B1).

Regarding Claim 2:

Sato '407 in combination with Sato '198 discloses all the claimed elements as listed above.

Sato '407 and Sato ' 198 in combination does not expressly disclose that the reference image data and the inspection image data are at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern.

Hiroi teaches wherein the reference image data and the inspection image data are at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern ("From the strength (brightness) of a digital image signal correlative to the yielded secondary electrons detected by the sensor 11 in a place coinciding with the outside shape of a pattern (material A or B)..." at column 21, line 52).

Sato '407, '198 and Hiroi are combinable because they are in the same field of manufacturing inspection processing.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to teach that the [wherein the] reference image data and the inspection image data are at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern.

The suggestion/motivation for doing so would have been to provide a distinct functionality of the inspection and for the user to readily ascertain that the pattern is easily identifiable and that no defects exist based on the shape of the inspection pattern.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the analysis of the brightness of the inspection image of the inspection pattern and a shape of the inspection pattern taught by Hiroi with the method for inspection of an exposure tool of a semiconductor device as disclosed by the combination of Sato '407 and '198 to obtain the claimed invention as specified in claim 2.

Regarding Claim 3:

Hiroi teaches wherein the abnormal inspection image occurs due to a defect including at least one of dust, a scratch in an illumination optical system which forms the effective light source, and an aberration of the illumination optical system (Refer to Figure 4b, "Image with Defect Appearing Small").

Regarding Claim 4:

Hiroi teaches the inspection method wherein the imaging components are a plurality of pinholes provided in an opaque film ("A semiconductor is fabricated on a semiconductor substrate (wafer) via a film forming dry process for forming an insulator film such as an interlayer insulator film or a guard film and a wiring metal film, an etching dry process for forming an insulator film pattern having a circuit pattern and through-holes..." at column 33, line 29).

Regarding Claim 6:

Hiroi teaches wherein the pinholes implement a diffraction grating having a translucent film and a transparent portion arranged in a grid pattern (Refer to Figure 16, numeral 48 and 49; "...a potential providing device 19 such as a grid disposed between the objective lens 18 and the

wafer (object) 20, a wafer holder 21 for holding the wafer 20 mounted thereon..." at column 24, line 67).

Regarding Claim 7:

Sato '407 discloses wherein the reference image data and the inspection image data further include a variation of a center position between at least one of the inspection patterns formed by a zeroth-order diffraction beam ("As shown in FIG. 2, zeroth-order diffraction light 6, ...accordingly, a zeroth-order diffraction pattern 32 and positive and negative first-order diffraction light patterns 33a and 33b are created on the wafer 5." at [0062]) of the diffraction grating and an outer edge formed by a plurality of first-order diffraction beams, and a size of the outer edge (Refer to Figure 6a-6h).

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato ' 407 in combination with Sato et al. (US 6,317,198 B1) as applied above, and further in view of Schulze et al. (US 7,221,788 B2).

Regarding Claim 5:

The combination of Sato '407 and Sato'198 discloses all the claimed elements as listed above. However, the combination of Sato' 407 and Sato '198 does not specifically disclose imaging components are a plurality of lenses in a lens.

Schulze teaches wherein the imaging components are a plurality of lenses in a lens array ("To record an image of the pattern formed on the mask, the mask is irradiated with light from one side and an image of the light transmitted through the mask is recorded using a sensor mounted

on the other side. A lens projection system is used to yield a sharp image." at column 9, line 57).

Sato ('407 and '198) and Schulze are combinable because they are in the same field of semiconductor defect detection.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to provide a plurality of lenses in a lens array as the imaging components for this invention.

The suggestion/motivation for doing so would have been to create a more efficient defect inspection tool. Utilizing a plurality of imaging components would create multiple positions to calculate and determine artifact and defects in an inspection method/technique.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the lens array as taught by Schulze with the method of manufacturing a semiconductor device as disclosed by the combination of Sato'407 and Sato '198 to obtain the invention as specified at Claim 5.

Response to Arguments

13. Applicant's arguments see page 8 filed 29 October 2007, with respect to Claim Objections have been fully considered and are persuasive. The objection of claim 12 has been withdrawn.

14. Applicant's arguments, see page 8, filed 29 October 2007, with respect to the rejection(s) of claim(s) 15-20 under U.S.C. 102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new

ground(s) of rejection is made in view of Hiroi (6,172,365 B1) in combination with Sato et al. (US 6,317,198 B1) under U.S.C. 103(a).

15. With respect to the rejections of Claims 8-14 under U.S.C. 102(b), the remarks have been fully considered. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yamada et al (US 6,222,195 B1) in combination with Noguchi et al. (US 6,016,187).

16. With respect to the rejections of Claims 1-7 under U.S.C. 103(a), the remarks have been fully considered and upon further consideration, a new grounds of rejection is made.

Summary of Remarks and Responses

Summary of Remarks (@ page 9)

A. Claims 15-20

For example, Hiroi fails to disclose a combination including "placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film," as recited in claim 15.

Hiroi fails to disclose that the materials deviate from an optical conjugate plane of the insulator film. Hiroi thus fails to disclose a combination including "placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film," as recited in claim 15 (emphasis added).This cannot constitute a teaching of "placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film," as recited in claim 15.

Examiner's Response: Examiner agrees. From the applicant's own definition of "optical conjugate plane" as stated at paragraph [0041], the Examiner contends that the "optical conjugate plane" is the front surface of the inspection photomask where a pattern of pinholes is deviated through a surface of an exposure target substrate.

Sato teaches placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film. At the abstract of the Hiroi invention, an "electron beam inspection method includes the steps of...obtaining an image of the object...". Although the Examiner does not fully agree with the applicant's arguments, Examiner has now relied upon another reference to make up for the deficiencies regarding some claimed elements.

Summary of Remarks (@ page 10)

B. Claims 8-14

For example, Yamada fails to disclose a combination including "inspection patterns obtained by projecting exposure beams output from a plurality of effective light sources onto the resist film coated on a surface of an exposure target substrate by a plurality of imaging components, the imaging components placed so as to deviate from an optical conjugate plane of the surface of the resist film," as recited in claim 8.

However, Yamada only discloses emitting a single electron beam, and thus fails to disclose "projecting exposure beams output from a plurality of effective light sources," as recited in claim 8 (emphasis added). Moreover, to the extent that microdots 15 of Yamada can reasonably be considered as corresponding to Applicant's claimed "imaging components," Yamada does not disclose that microdots 15 are "placed so as to deviate from an optical conjugate plane of the surface of the resist film," as recited in claim 8. Yamada thus cannot anticipate claim 8.

Examiner's Response: A new grounds of rejection have been made with regards to Claims 8-14. Claim 8-14 now rely upon the teaching of Yamada in combination with Noguchi et al. Yamada discloses at the abstract, "scanning, in each of at least two exposure columns, the charged particle beam over an area containing a mark on a surface substantially at the same height as the object...".

For clarity, Examiner did not agree that the microdots of Yamada can not be considered "imaging components". If there are multiple wavelengths emitted from one or more light sources, it result is still going to be predictable which is that the inspection patterns are going to be obtained, and further that the imaging components can still deviate from the same conjugate (or imaging) plane. Applicant defines an "optical conjugate plane" at paragraph [0041] in which as shown in Yamada at Figure 2a, the electron beam projects onto the substrate 11 and further at numeral 15. An electron beam can be made of multiple LED's thus a plurality of effective light sources. An electron beam is also defined by many of ordinary skill in the art as a "group of parallel lines or sources of electromagnetic radiation."

Summary of Remarks (@ page 12) Rejection under 35 U.S.C. § 103(a)

C. Claims 1-7

Applicant respectfully traverses the rejections of Claim 1-7 under 35 U.S.C. 103(a). Sato fails to teach or suggest a combination including at least "measuring inspection images of the inspection patterns, and processing the inspection images with the reference image data so as to provide a plurality of inspection image data," and "determining an abnormal inspection

image by the inspection image data," as recited in amended claim 1.

Furthermore, because Sato provides no disclosure, suggestion, or motivation of at least "provid[ing] a plurality of inspection data," from "processing the inspection images with the reference image date," the claimed invention, in providing such processing, is not obvious in view of Sato for this additional reason.

Hiroi fails to cure the deficiencies of Yamada. Accordingly, claim 1, as a whole, is also not obvious in view of Sato and Hiroi.

Examiner's Response: Examiner agrees. However these arguments are moot in view of new grounds of rejection.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIA M. THOMAS whose telephone number is (571)270-1583. The examiner can normally be reached on Monday-Thursday 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Mia M. Thomas/
Examiner, Art Unit 2624

VIKKRAM BALI
PRIMARY EXAMINER